

ABSTRACT

A self-compensating hydrostatic (pressurized fluid film) linear bearing that maintains a fluid gap between a carriage and a rail when relative forces are applied. The geometric shape of the rail and mating carriage enable the bearing to have very high stiffness and load capacity without excessive detrimental carriage deformation. The carriages contain bearing grooves and lands which control and use fluid pressure to provide a very high degree of restoring force in response to changes in the fluid gap. The fluid emanating from the bearing gap is prevented from immediately leaking from the bearing carriage, and is instead routed back to the source from which it is pumped, thereby sealing the bearing carriage and simplifying the handling of the lubricating fluid. The hydrostatic bearing is particularly designed to be compact and to be bolt-for-bolt compatible with conventional linear bearings.